THE NEW JERSEY FORESTER

AN ILLUSTRATED BI-MONTHLY JOURNAL DEVOTED TO FORESTRY.

OFFICIAL ORGAN OF THE SOUTH JERSEY WOODMEN'S ASSOCIATION, PUBLISHED UNDER THE AUSPICES OF THE AVALON SUMMER SCHOOL OF FORESTRY.

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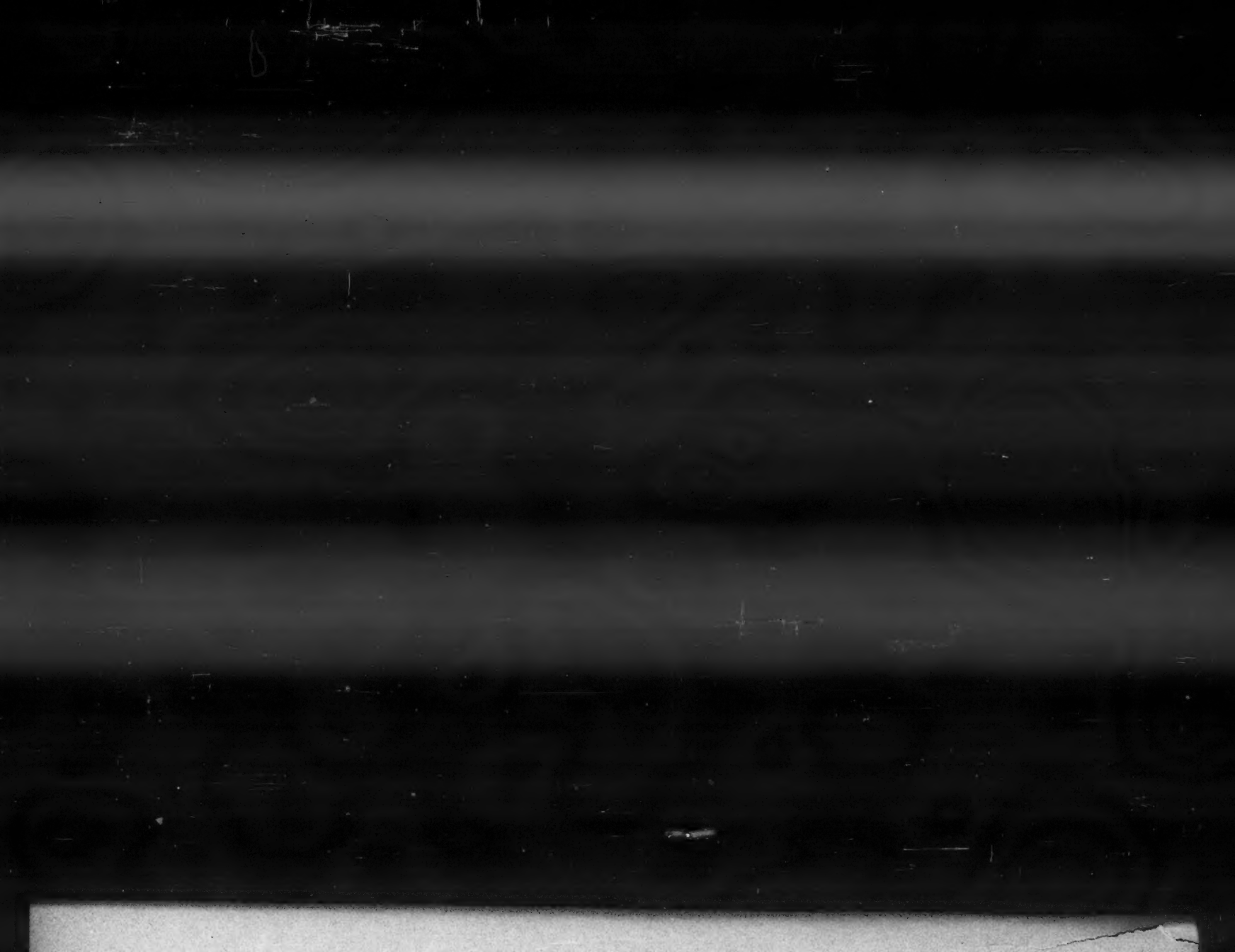


THE NEW JERSEY FORESTER,
A Bi-Monthly Journal Devoted to the Development of our Forests
Edited by John Gifford, May's Landing, N. J.
Vol. I. May 1, 1895. No. 3

There can be no doubt about the filthiness of the water used by Philadelphia. It is also evident that expensive filtration plants are unnecessary when plenty of the pure article is available. The softness of a water is always worthy of much consideration. The waste in soap alone is an item of as much importance to those who try to keep themselves clean as to soapmakers. Although politically a part of Pennsylvania, commercially and socially Philadelphia is the centre of a broad area. The purity of its drinking water concerns Jerseymen as well as Pennsylvanians. Yet only a few miles away, in the pine lands of South Jersey, there is an abundance of the softest and purest kind of water. It flows through sandy soil in a very sparsely inhabited region which will remain forest-clad for many ages, owing to its unfitness for other purposes, in spite of its nearness to large population centres.

SEVEN MILE BEACH.

The only objection to this supply seems to be that it is located in another State. This ought to be a petty obstacle when the health of such a community is concerned.

Camden can increase her population by utilizing this supply. Her death-rate will decrease and many Philadelphians will cross the river for such a tempting bait in spite of their patriotism.

In order to insure a pure and regular supply for years to come it will be necessary of course to carefully regulate the forests of the region.

There is a movement on foot for the establishment of a National School of Forestry in connection with the Division of Forestry at Washington.

Another important movement has in view the establishment of a chair of forestry in every agricultural college in the United States.

If successful they will be the most important steps ever made in the progress of forestry in this country.

Education in the rudiments of forestry is wofully lacking in America. Although some may claim that the forest area is as large to-day as it was four centuries ago, every person knows that its nature is far from the same. To produce the largest amount of the most valuable forest products on the smallest area at the least expense demands the services of expert foresters. The rudiments of forestry are the same the world over but the details for each locality in this country have received practically no attention. Each species must be studied in relation to its neighbors and the peculiar soil, climatic and moisture conditions in which it lives. In such a country as this each State must work out its own details; the Forestry Division and the Nation School of Forestry will have enough to do in caring for the for-

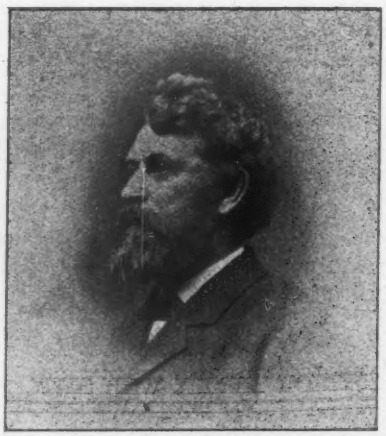
ests belonging to the general government and in centralizing the work done throughout this country. Few institutions are better fitted for such work than our agricultural experiment stations and colleges and their usefullness and influence will increase accordingly.

Leaders of Forest Reform.

II. DR. JOSEPH T. ROTHROCK.

Dr. Joseph T. Rothrock, the subject of this sketch, was born in McVeytown, Pa., in 1839. He belongs to one of the oldest and most influential families in the State of Pennsylvania.

On the seventh of August, 1862, he enlisted as a private soldier in Co. D. 131st Regt. Penna. Volunteer Infantry. He was commissioned Captain of Co. E. 20th Regt. Penna. Volunteer Cavalry in July, 1863. On the sixth of January. 1864. he was honorably discharged at Harrisburg. He participated in the battles of Antietam and Fredericksburg, being shot through the thigh in the latter engagement, when his company in forty minutes lost, in killed and wounded, thirty-four out of forty-two men.



DR. JOSEPH T. ROTHROCK.

Returning home after his services in the army he resumed his studies in the Lawrence Scientific School in Harvard University and was graduated there in 1864. He was also graduated from the Medical Department of the University of Pennsylvania in 1868.

For two years he was Professor of Natural History in the State College of Pennsylvania. In 1876 he was elected Professor of Botany in the University of Pennsylvania and in 1877 Michaux Lecturer on Forestry for the American Philosophical Society.

In 1866 he accompanied an exploring expedition from Northern British Columbia to the confines of Alaska. In 1873 he was appointed botanist and surgeon to the U. S. Geographical and Geological Surveys, west of the 100th meridian, under Lieut. G. W. Wheeler. He is, for the most part, author of the sixth volume of these surveys. He prepared a sketch of the Flora of Alaska, which was published by the Smithsonian Institution in the report for 1867.

In 1892 he was requested by the Pennsylvania Forestry Association to devote his whole time to forestry work and in 1893 was appointed Forestry Commissioner for the State of Pennsylvania, which position he still holds, although still nominally connected with the University of Pennsylvania.

These are but some of the salient points in the career of Dr. Rothrock, who, by his contributions to *Forest Leaves*, investigations, lectures and untiring efforts, deserves to be ranked among the foremost leaders of forest reform in America.

Good Roads.

The report of Mr. Edward Burrough, Commissioner of Public Roads and President of the New Jersey Forestry Association, for 1894 is a neat little volume describing the progress of road-building in New Jersey. There is no room for doubt that the construction of good roads pays in the end. In wooded districts roads serve as fire-breaks. A road is always an excellent point of vantage in fighting a fire. Were the sides of the roads in the Southern Interior of New Jersey kept free from combustible matter, as was suggested by the Governor in his message, there would be much less danger from forest fires. The value of timber is rated mainly by the nature of the road over which it is necessary to haul it. In Germany some roads for transporting timber are macadamized and one is mentioned in the report of the Chief of the Forestry Division for 1893, which saved its cost in two years.

The itinerary of the May meeting of the American Forestry Association in Southern New Jersey is printed on pages 35 and 36 of this issue.

Pure Water for Philadelphia.

By Dr. Seneca Egbert.

Philadelphia should be much concerned about her water-supply, both for the immediate present and for the future, inasmach as there is probably no municipal question so intimately related to the health and continued welfare of its citizens. The water now in use, mainly from the Schuylkill River, though not as impure as often reported or as it might be, is by no means safe and satisfactory to the usèrs. As a remedy for the time being, filtration has been proposed, and this if properly managed, will undoubtedly render the water much purer and will markedly lower the sick and death rate due to typhoid fever and certain other diseases.

Notwithstanding this, the time cannot be far distant when, for either one of two reasons, the Schuylkill will have to be abandoned as the sole or even the main source of supply for the city. In the fisrt place, the percentage of impurities in the water must progressively increase with the growth of the cities and towns that discharge their sewage into the river and its tributaries and this percentage will thus constantly tend to approach the limit beyond which it will be unsafe to use the water, even though filtered. Secondly, and perhaps of more immediate if not of more ultimate importance, the quantity furnished by the Schuylkill promises to soon be inadequate for the city's needs. The average daily total consumption of water for Philadelphia during 1894 was 195,718,747 gallons, an average daily cousumption per capita of 156 gallons. The increase in population between 1880 and 1890 amounted to 23.58 per cent. Should this rate of increase be maintained, the city's population would number 1,293,838 in 1900 and 1, 598,925 in 1910. With the above per capita demand, an average daily supply of 249,432,300 gallons will be needed at the latter date. It is very questionable whether this amount of filtered water can be supplied from the Schuylkill, considering the increased proportion of impurities which it will then contain. For several years a water famine has threatened the city each summer. Avoidance of this danger is promised with increased reservoir capacity, but this means that much more than the average daily supply must be pumped, filtered and stored in advance of the dry season, this necessitating a much larger area of filter beds than that just sufficient for the daily supply, and consequent increase in expense of maintenance.

And though it may be conceded that the per capita supply is somewhat expensive and might be lessened by care on the part of consumers and by the use of water meters, it must not be forgotten that the habits of the people are hard to overcome, that a much larger proportion of this water is needed by our manufacturing enterprizes than in other cities, and that from a sanitary standpoint the water so freely used in the cleansing of sidewalks and pavements is not altogether wasted; so that, perchance from 100 to 150 gallons per capita per diem is not so very much in excess of what the people need and will insist upon having. As will be observed, the foregoing figures apply only to the very immediate future, and the discussion has been confined to them that the imminent needs of the city might be made plain. But it will be surely admitted without controversy that true economy will warrant the attempt to find and secure a water supply which will be adequate and safe for use for a much longer period than merely fifteen years, and when the city has a population even twice as great as at present.

Water taken from the Delaware within the city limits, even though it be subsequently filtered, is out of the question. Filtration may do much to purify a water, but it must not be trusted to do everything. A competent authority has shown that the proportion of sewage in the water of the tidal pool about the city amounts to one part in twelve of the total inflow, equivalent to four gallons or one pailful of sewage per barrel of water, a quantity sufficient to condemn it for aesthetic reasons, if for no others.

Where then shall we look for our future supply? The upper Schuylkill water-shed is out of question on account of its insufficiency and for other reasons. Artesian wells are also manifestly inadequate for the city's needs. The Perkiomen and Tohickon water-sheds have been suggested, but are not sufficient in themeslves and could only serve as adjuncts to the filtered Schuylkill supply. Lake Erie or the Susquehanna would necessitate enormous expenditures, not to be thought of in the present condition of the city's finance. Until recently, therefore, the upper Delaware has seemed the most available and adequate source of supply to those who look forward more than a few years into the future.

However, the attention of those interested has recently been directed to the water-shed of

southern New Jersey and to the writer it seems that they have certain advantages over that of the upper Delaware. In the search for a water-supply for a city of the present and future size of Philadelphia, it is evident that certain points must be kept ever in mind; these are quantity, purity, availability, expense of delivery within the city's boundaries and the possibility of keeping the source uncontaminated during future years.

As to the first of these, enough water can probably be taken from the Upper Delaware above Easton or from southern New Jersey to supply the city with all required for a century to come. The average daily flow of either source is far in excess of all present needs, and the supply of each could be very materially increased by conservative storage methods.

As regards purity, little fault can be found with the water from either of these sources at present, although the following from the Reports of the State Geologist of New Jersey for 1892 and 1893 will be interesting.

"There are certain peculiarities of southern New Jersey water-sheds which are favorable to the purity of their waters. Large areas are very sparsely populated and almost entirely in forest. The nature of the soil permits very free percolation of the water which falls upon it in rain. No matter how heavy the downpour, it is a rare sight to see any water running over the surface to a stream. Soaking at once into the sand it gradually goes to the stream bed. Consequently, it can carry with it no effete organic matter to pollute the water courses, as is done by surface water over steeper slopes and less penetrable soils after heavy showers. Muddiness is almost impossible. The existence of malarial diseases is unknown even in the densest and wettest of the southern New Jersey swamps. This fact is indisputable and should command the attention of sanitarians."

"So far as analyses can show, the southern New Jersey waters are excellent soft pure waters, as soft as rain water. Their smooth, gliding currents give little opportunity for aeration."

If the water is taken east of the marl bed, which more or less closely borders the Delaware, it will practically always be perfectly clear and soft, a striking contrast to the hard, muddy Schuylkill water which every Philadelphian would appreciate and which could not be promised for the Upper Delaware water at all times, since part of it would come from open and agricultural land and from a more or less calcareous soil. Moreover, the saving in soap from the use of such a soft water would be a very considerable item annually. One grain of chalk in a water, wastes about eight grains of soap, and it is evident, that this item is worthy of serious consideration in the selection of a supply for the city. But it is with respect to the cost of supplying the water and to the possibility of protecting the gathering grounds, that the difference between the two sources is most marked. To bring the supply from the points proposed on the upper Delware, would necessitate the construction of an expensive aquedect.

This is exclusive of any outlay looking to the control of any part of the water-shed. Moreover, such a work would require many years to bring it to completion, and before the water could be delivered within the city limits. On the other hand, it is proposed to bring 300,000,000 gallons of the South Jersey water to Philadelphia daily within three years of the time of beginning operations and with a primary expenditure of only about fifteen million dollars, this also including the absolute purchase of about 200 square miles of the water-sheds supplying the water. The plan proposed is "to dam at the head of tide, the several streams forming the Mullica River; to gather their waters by back-flow into a reservoir at the village of Atsion, where the New Jersey Southern Railroad can deliver coal cheaply; thence to force them further westward into a reservoir, having an elevation of 70 feet above tide; thence to let them flow by gravity through a canal to a reservoir at an elevation of 61 feet, to be formed by damming the north branch of Cooper's Creek; thence from this reservoir through an aqueduct or steel pipes partly to a distributing reservoir for the supply of Camden, N. J., but mainly to the eastward end of a tunnel under the Delaware River to pumping stations in Philadelphia, to be there lifted into the several distributing reservoirs."

This motion and lifting of the water will serve to give it that aeration which it lacks in the natural streams, and to remove what little volatile organic matter and tinge of color it may have, so that it will probably reach the city absolutely clear and colorless and as nearly pure as natural water of the kind can be.

The estimates, both as to the total certain daily supply for the year which will aggregate, if necessary, at least 450,000,000 gallons, with the possibility of further increase, and as

to the cost of land, reservoirs, aqueducts, tunnels, etc., have been made by Mr. C. C. Vermule of New York, Engineer to the New Jersey State Geologist, and are "the result of investigations, diligently continued during a number of years, into the rain-fall and river-flow of the region."

"Probably no water project for Philadelphia has been more thoroughly studied, or by a more competent person than has this one."

The last point, that in respect to the protection of the source of supply from pollution, is of serious importance. The upper Delaware water-shed covers parts of three States, and any legislation granting adequate power of protection and the right to condemn nuisances, etc., would necessitate the action and sanction of three distinct legislative bodies and executives; while the water-sheds of the southern New Jersey supply, lie entirely within the bounds of a single State and by far the greater area can be purchased outright and thus protected forever from pollution. Moreover, the Delaware water-shed is now somewhat well settled by an agricultural population, as well as with several villages, so that considerable money would probably be needed to extinguish existing rights and conditions that might be dangerous to the purity of the water; while the South Jersey area is practically uninhabited and free from polluting agencies, and can always be kept so.

There should be no question as to which of the two plans will be most economical, advantageous and satisfactory in the long run to the citizens of Philadelphia.

To the objection that New Jersey might be unwilling to permit such a water-supply to be diverted to the uses of a city of another State, it may be said that the plan is of as much importance to Camden as to Philadelphia and that no fear need be had of any obstruction on the above grounds.

Whatsoever is to be done should be begun at once. Conditions are constantly changing, property will increase in value and every day's delay only postpones and increases the ultimate cost of the supply selected. But even though a filtration plant should be selected as a solution of the problem for the present, and it would undoubtedly be of great value in improving the health of the city, it is the writer's belief that it would still be wise to take the necessary measures as soon as possible looking to the bringing of the South Jersey water aoross the Delware and to substitute it for the Schuylkill water at the earliest possible date. Nor need the filters be abandoned nor the money spent for them be looked upon as wasted. Our manufacturing interests of various kinds have adapted themselves to the Schuylkill water and a change to a new supply, though a pure one, might be disturbing. The city could, therefore, continue to furnish these interests with filtered water from the present source, thus maintaining the filters in active efficiency for emergencies; while the mass of the population enjoyed and employed the purer Jersey water for domestic purposes.

Surely the opportunity is a golden one and, as far as our present knowledge goes, the city will probably never have an equal chance of securing such benefits at such low cost. Should the present condition of municipal finances prevent the undertaking of the work immediately by the city itself, there is scarcely a doubt that a thoroughly responsible company can be formed to begin operations at once and to sell the water at reasonable rates to both Philadelphia and Camden until such time as the two cities should be ready to purchase the plant outright.

But the points that must not be overlooked nor forgotten are that pure water is an absolute necessity to Philadelphia's health and welfare; that the present supply will soon be inaquedate in quantity and actually dangerous in quality; that whatever plans are adopted must look ahead at least fifty years, and that delay only adds to the cost and difficulty of securing a proper supply and meeting the conditions that are bound to arise and exist.

"In the Guiana Forest" by James Rodway is a charming book published by Chas. Scribner's Sons of New York. It is both entertaining and instructive. The great tropical forest, which Grant Allen in the preface calls "biological headquarters," is described in a graphic way and to properly review it would cover much space. It is a good book, worthy of being read and studied from beginning to end.

In referring to an article in *Timehri* (a quarterly published in British Guiana) by Mr. Rodway, the author of this book, the *Review of Reviews* says: "Mr. Rodway can write, and as he describes the magnificent timber trees of Guiana you seem to stand under their branches and realize how intense is the struggle for existence—so intense indeed ,that for a time one almost regards the trees as living beings which tear with tiger claws at one another's vitlas."

The Forests of Colonial Jersey as the Settlers Found Them.

By Francis Bazley Lee.

Skaakbee, the New Jersey of Indian times, jutting into the sea; her wide sand plains of the South, covered with pine and oak, her sinuous tide water streams, lined with gum, magnolia and maple, her swamps fragrant with the odor of the tapering cedar; her valleys and hills of the North green with chestnut, walnut, spruce and birch; the infrequent hunter along the rivers, the silence of primeval woods broken only by the song of birds, the cry of wild animals or the warring elements — such were the forests of colonial Jersey as the settlers found them.

Two centuries ago — and more — separates us from our ancestors, the immigrants. Although by reason of the life of the day which required constant activity and enterprise as a price for existence, they preserved few records; nevertheless there have come down to us allusions to the forests of New Jersey in pre-revolutionary times which are as interesting as they are authentic. With them as with us, the colonists recorded only those things that are without the pale of ordinary observations, and to them the unbroken miles of forest were so real that they spent their energies in ridding the land of trees rather than in observing this phase of Nature.

One of the historiographers of the earliest English settlements in Jersey or the vicinity thereof was Master Robert Evelyn whose "Description of the Province of New Albion" was published in London, 1648. Speaking of what is practically now New Jersey he says that it is "replenished with the goodliest woods of oaks and all timber for ships and masts, mulberries, sweet cypresse, cedar pines and firres, four sorts of grapes for wine, and raisins and with the greatest variety of choice fruits. The uplands, covered many months with berries, roots, chestnuts, walnuts, beech and oak mast." He also enumerates "sassafras, with wilde fruits, pears, wilde cherries, pine, apples and the dainty parsemenas" (Persimmons). * * * "And there is no question but almonds and other fruits of Spain will prosper as in Virginia."

The building of ships and the making of pipe staves is urged in this tract.

The Quaker settlers of West Jersey were loud in their praise of the forests. Mahlon Stacy, writing from Burlington to England, 4th mo. 26th, 1680, says:

"I have seen orchards laden with fruit to admiration, their very limbs torn to pieces with the weight, and most delicious to the taste and lovely to behold. * * * "We have from the time called May to Michaelmass great store of very good wild fruits, as strawberries, cranberries and hurtleberries, which are like our bilberries in England" * * * * "Indeed the country take it as a wilderness is a brave country" * * * "and more wood than some would have upon their lands."

In East Jersey at this period Gawen Lawrie writing to London 1st, 26th day, 1864 says:

"The trees are very tall and straight, the general are oak, beech, walnut, chestnuts and acorns lie thick upon the ground for want of eating; peaches, vines, strawberries and many other fruits grow commonly in the woods, there is like wise gumtree, cedar, white-wood, like our fir tree, walnuts, chestnuts and others lie thick on the ground."

"The towns that are already seated, being in woodiest places." * * "The wood here is not so hard to clear as many think, they do not pull it up by the roots, but cut them about a foot or more from the ground." It is further stated that four men could cut seventy trees per day.

In the Description of the Province of West Jersey written by Gabriel Thomas and printed in London in 1698, we find much of interest which will fittingly terminate this first paper. Thomas writes:

"In this country also is a great plenty of working Timber, as Oaks, Ash, Chestnuts, Pine, Cedar, Walnut, Poplar, Fir and Masts for Ships with Pitch and Rosin" * * "Timber River, alias Glocester, which hath its Name from the great quantity of curious Timber, which they send in great Floats to Philadelphia. * * The Trade in Glocester County consists chiefly in Pitch, Tar and Rosin."

In speaking of Salem County, it is worthy of note that the present attempts to send cranberries to England are by no means of recent date. This fruit grows in great plenty says Thomas, "which in Picle might be brought to Europe."

Such brief extracts could indeed be continued indefinitely and are merely cited to show that the colonists had a proper appreciation of the forests of this State. A continuation of this subject will deal with early industries dependent upon these forests and the relations that the Indians bore to the country of noble trees— a country "so fair and pleasant to look upon."

TREE PLANTING.

Arbor Day, April 26th, was generally celebrated throughout this State. Although too late in the season for succesful planting, the interest evinced shows that the subject is gaining ground from year to year. When a seed is once placed in the ground the result is beyond prediction.

At the meeting of the Pennsylvania Horticultural Society at the New Century Drawing Room, April 23rd a paper was read by Burnett Landreth on "Trees for City Streets."

"There are a dozen or two dozen kinds of trees adapted for use in the city streets," he said. "They should be allowed to reach the diameter of about twenty inches, and should then be replaced by younger trees."

"The system of Boston appeals very strongly to us for its excellent general effect. Entire blocks are planted with one tree alone, the single species in fact being often the only one on a whole street."

"The object of having trees on our streets is, to my mind, not so much to give shade to the dweller or the pedestrian, as to beautify and to present a pleasing vista. The requisites of a good street tree are manifold; the first is ease of transplantation, then adaptability to various situations, resistance to various ills (to insects particularly), leafy habit, few limbs, attractive bloom and general cleanliness."

"Under the latter head there are two trees often seen in Philadelphia which ought not to have been planted—both the buttonwood and horse-chestnut litter the streets badly."

"One of the sharpest ills that the tree is now required to resist is the street pruner. The common tree cutter ought to be arrested for leaving such eyesores in the public view. The hacking that the tree receives at his hands, the lopping of big limbs, the loosening of bark, etc., is the first step toward decay."

"The magnolia, Oriental buttonwood, sugar maple, catalpa, and a dozen or two other varieties, are very good. The female ailanthus is also acceptable."

"When the ailanthus came out years ago, New York got all the female and Philadelphia all the male trees. The males have been found very objectionable, and the tree has been brought into disrepute by the horrible stench they emit in flowering time. The female tree is well liked in New York, and can only be objected to on the score of the innumerable shoots it sends out in the spring."

"The proper thing to do would be to bring sufficent influence in Councils to pass an ordinance appointing a city forester, to whom shall be given the care of all trees in the city; providing also for a annual census of trees, and ordering that every tree in the city be registered and looked after continually. The city should also buy annually 4000 or 5000 trees to be sold by ones and twos to citizens who wish to plant them all the planting to be done under the direction of the forester."

Game and the Forest.

BY A GAME WARDEN.

The preservation of game and the perpetuation of the forest go hand in hand. Many birds and other animals are dependent upon the forest for food and shelter; on the other hand, forests are distributed by animals over the face of the globe.

There are agents at work endeavoring to spread the seeds of trees to the end of the earth. But this is prevented by an excess of cold, by a lack of moisture, by high mountains or wide seas. The tree which is best able to overcome the barriers of nature predominates over the broadest area.

Many trees produce seeds which are bright colored or sweet to the taste to attract animals and increase the chances of their perpetuation.

But the birds, the most independent of earth's creatures, spurn the mountains and seas and transport the seeds of trees and other plants, a distance of many miles.

It is an easy matter for a bird to eat a gumberry in Maryland and drop the indigestable stone in a Jersey swamp. Another bird fifty years later may dine on the mucilaginous berries of the American mistletoe in Delaware and a few hours later wipe his bill on this same gumtree. The sticky seed may sprout and the mistletoe may spread, gnarl, kill and end the eventful history of a prosaic gumtree. The story is not yet ended however. A possum may make the hollow trunk of this tree his home and may drop many seeds of the persimmon in the region.

The birds in going southward in the Fall, move by stages. They are chased south by the cold and consequent lack of food, but in the Spring, actuated by the strong reproductive impulse, hurry northward, resting only for a short time, here and there, to their old nesting places in the north. They bring with them on their feet and in their stomachs the seeds of southern plants. In coming they produce that indescribable joyful feeling that the winter is over and that a complete rejuvenation is about to begin.

In looking into the matter one is suprised to find what an important part the birds play in the distribution of trees. The red cedar, for instance, the berries of which are relished by birds, approaches nearest to perfection in the moist climate of the Gulf region but owing mainly to the wandering, semi-gregarious

robin and other birds, is the most widely distributed of American trees. In lines along fences, here and there in old fields in this region trees from the seeds which have been dropped are common.

As the protector and afforder of food to game birds the forest deserves more care from sportsmen than it has ever yet received in this country. Hunters are often guilty of criminal negligence in causing fires in the woods, thereby destroying the game which gives them pleasure.

More birds are destroyed by forest fires in one year than all the hunters in the country could kill in a life-time. Fire not only kills the animals of the woods, but robs them of their food. The writer wandered for three days last Summer over a burnt area without seeing a living animal of any kind in the woods except insects. On all sides it was a sea of blackness save in places for the white and parched earth. Silence reigned; even his horse seemed to recognize that something was wrong; it looked like a wornout world, like the surface of the moon.

It is pitiful to see, friends and enemies, peaceful through fear, rabbits, foxes, snakes and whatnot chased and destroyed in the heat and smoke of a forest fire. During the spring of the year, when, owing to the nature of the woods and winds, fires rage, hundreds of birds are cooked in the nest. It is therefore the duty of sportsmen and even pothunters to use care in the woods, in respect to fire for the sake of the game, if for no other reason.

The work of the game warden and fire warden may be profitably combined.

In our western country the underbrush, which is essential to the forest, is burned to facilitate hunting. This is usually the work of the Indian. How a true hunter, a lover of the forest and the animals which it feeds and shelters, could deliberately build his camp fire at the foot of a mammoth Californian tree so that the flames burn and blacken its base is a mystery to the writer. Nevertheless hunters have thus injured many of those noble trees whose ages must be reckoned in centuries and not in years.

Game laws are practically useless while fires are allowed to burn. It is fire which is leading to the extermination of many wild animals, and fires will occur, just as long as men are thoughtless in the woods. It is only by consant watching on the part of the warden and constant care on the part of the hunter and woodman that fires can be reduced to a minimum.

Like crime, fire the arch enemy of the American forest, by eternal vigilance and the cooperation of everybody, can in time be thwarted.

The establishment of reservations in every state to say nothing of those immense tracts of land belonging to the federal government and which by the stroke of his pen the President of the United States may forever reserve for the benefit of this and future generations, is a matter which ought to concern every true sportsman. Every commonwealth should set aside a territory the forest of which should be properly regulated, where no man may hunt at any time. The animals of the contiguous country will soon learn that there they can find a refuge and breeding place. This will prevent the extermination of those animals and the reservation will become a nucleus for the stocking of the region. Poachers on these lands should be severely punished and wardens should be so many and watchful, that fire could not gain headway.

In caring for these reservations, it is easy in America to jump from one extreme to another, that is from a period of lavish cutting and burning to suddenly, absolutely prevent the cutting and utilization of trees for a considerable period. It is like abandoning a wornout garden to the weeds. It is just such a garden that needs the most care and attention. On such reservations the axe and saw must be used but in the proper way at the proper time.

The forestry movement ought to be able to count the hunters among its staunchest supporters. It was love for the chase, that furnished the royal families of Europe with wholesome divertisement, that we have to thank for those beautiful forests and parks which the world enjoys in story if not in substance. History and poetry are savored by their influence.

To return to the work of birds, numerous instances can be cited where a whole forest has resulted from their droppings. In that way the waste places, abandoned fields and the like, without the intervention of man, become forested and useful.

Birds have become peculiarly separated as to habitat, some preferring the field, others the forest and still others the shore. Each group has become adapted in habit coloring and so forth to the environment in which it lives. No doubt many of the field birds were once tenants of the woods. Fire, axe and other contending forces, drove

Many of these birds however, seek shelter at certain times of the year in the forest, since a

forest tends to lessen in many ways the destructive forces of nature. Many varieties of the quail may be considered field birds but they often take to the woods and remain there for some time. Throughout the cold of the last winter it was not uncommon to find them huddling together or actively scratching in the dry oak leaves under the shelter of a bushy evergreen laurel. Many shore birds roost in the forest, in fact, rookeries are common in almost every wooded country.

Many believe that the birds do the forest a great service in destroying insects destructive to trees. This is however a question. Insect life is abundant in the forest. Rotten wood is usually alive with a great variety of worms and the like. Even in winter they may be found at work in decaying stumps. It was only the fifth of last March, when the weather was cold that the writer found hundreds of termites in a rotten pine stump. They were doing no damage. They were hastening the processes of disintegration and decay giving back to the earth and air, in other words, what the plant had assimilated in the processes of growth. One insect preys upon another. The whole of nature is an unending struggle. The bird however, does not discriminate between the useful and destructive kinds. Like ourselves, it selects the choicest morsel.

Some birds, such as the sap suckers are perhaps harmful to the forest. It is claimed that they are not sap suckers, as the name implies, but that they are insect searchers. The peculiar chains of circular holes so common on apple-tree trunks are produced by a species of sap-sucker.

The squirrels, mice and the like are potent disseminators of nuts. They usually store away more than they use.

It is often a wonder to some people, why oaks follow pines so quickly. If one examines a pine woods, he will find a few low oaks here and there, the seeds of which have been carried by squirrels or dropped by jays. Owing to a lack of sunshine they are unable to grow, but as soon as the pines are cut, assert themselves and an oak woods follows almost as if by magic. Nuts are usually supplied with a very hard protective covering in order to render them safe from the attacks of hungry animals. They are forced to work for the rich food which the tree has stored for the use of the young plant in Spring. But according to the unswerving law of compensation the seeds are accidentally disseminated over wide areas, by sacrificing to the squirrels a well earned tribute.

The depredations of the sparrow are well known. It drives away many useful birds and eats even the buds of trees.

It shows how careful we should be in the introduction of foreign species. No one can predict the result. The equilibrium of nature may be thus so easily upset.

At one time everybody thought that a certain person was doing Jamaica, a very great favor by introducing the mongoose. For a time it did some good in ridding the plantations of rats but alas, the birds which nestle on the ground have been destroyed, mice build their nests in banana bunches, snakes have been killed, insects have increased and now the mongoose is a greater pest than the rats. Every negro must keep a pack of dogs to protect his chickens.

As to larger game such as buffaloes and deer, it would be better for the forest were they all exterminated. These animals carry seeds but the amount of damage they do more than offsets the amount of distribution. Such a seed as that of the date would probably pass uninjured through the digestive apparatus of a camel and germinate if it falls in a suitable nidus, several miles from the parent plant. But just as soon as it appears above the surface of the soil another voracious camel will be ready to devour it.

Hungry cattle, goats, sheep, deer and buffalo are sufficient in themselves to destroy the forest of any country. Just as soon as the young tender plants appear above the surface, they are nipped at a time when least able to endure it. There are numerous instances, where goats have destroyed the forest. The writer has noticed hungry cattle in winter eating even the prickly leaves of the holly. There is little wonder that a large part of the Interior of this country is prairieland- the fires of Indians, millions of hungry buffaloes and an obstinate clay soil are sufficient to turn any wooded country into a grassy plain.

Large game is now so scarce that the damage thus caused is hardly worth considering, but with many species of birds which breed and seek shelter in the woods, is quite otherwise. Many of these owing to their enemies seek shelter and food in the region of clearing and houses.

Sportemen can serve their own cause in no better way than by protecting the forest, thereby protecting the game which is dependent upon it.

The Cultivation of the Peanut in Southern New Jersey.

By Dr. Chas. Mohr, Mobile, Ala.

Considering the climatic conditions of Southern New Jersey being favored by the milder temperature and greater humidity due to the vicinity of the sea, there is no doubt that the waste pine lands of the seaboard counties are well adapted to the cultivation of the peanut (*Arachis hypogaea*), wherever the porous sandy soil contains sufficient clay to give it the character of a sandy loam with a clayey somewhat retentive subsoil. The peanut requires a light porous soil not too sandy nor too dry with a fair supply of the nutritiive elements required for the successful production of a grain crop. This plant is a strong feeder, it has been found that in the production of a crop of sixty bushels to one acre, eighty-four pounds of nitrogen, forty-six pounds of lime, thirty-two pounds of potash and about fifteen pounds of phosphoric acid are appropriated by this plant. Of all the mineral constituents of the soil required, the presence of lime is most important for the proper fruiting of the vines and perfection of the nuts. May the soil be ever so rich in the other requirements and favorable to the growth of the plant, without the needed supply of lime the crop will be small and the nuts to a large extent will be empty "pops", as they are called. On the sandy lands of the Coast Plain, destitute of these elements, the want might be met to the best advantage by the application of about twenty to twenty-five bushels of burnt oyster shells or one hundred pounds of calcareous marl to begin with. These should be plowed in before the final preparation of the soil for planting. As recommended in the last Farmers' Bulletin issued by the U. S. Department of Agriculture, (Peanuts: Culture and Uses, Farmers Bulletin No. 25, 1895.) It would be best to mix them with compost, for these soils are destitute of organic matter. Only about one fourth of the nitrogen required, needs to be added to the fertilizing material, since the peanut, like many of the plants of the Bean Family, through the intervention of bacterioids investing its roots, causing numerous knotty swellings, draws its supply of this element direct from the atmosphere. In kainit is found a cheap supply for potash and in acid phosphate for available phosphoric acid. The formula devised in the publication named seems to be particularly well adapted for the soils of the section under consideration, calculated for one acre: barnyard manure 2 tons, cottonseed meal 150 lbs, kainit 100 lbs, acid phophate 50 lbs.

This manure is best plowed in broadcast early in the season, but might also be spread in the furrow in which the seed is to be planted. The application of proper fertilizers in sufficient quantity is indispensable for the succeessful cultivation of this crop.

The soil must be freed from roots, clods, and the like by fine pulverization until light and friable for the depth of four or five inches, and from the beginning kept free of weeds.

The best nuts must be selected for seed; nuts touched by frost before or after digging are to be rejected. There are several varieties cultivated, differing in their habit of growth and size of the nuts. In the sandy lands of the coast region in North Carolina the African variety with small nuts is mostly cultivated. In Southern Virginia the Virginian variety of spreading habit of growth and the nuts of larger size is mostly cultivated and on poor lands in the Southern Atlantic and Gulf States the Spanish variety, with stems more erect, is frequently preferred. Two bushels of seed (from twenty-four to twenty-six lbs to the bushel) are required for an acre. The seeds are hulled, care being taken not to break the skin covering the kernel. Experiments have shown that "level" culture is to be preferred to cultivation in "ridges" insuring larger crops, and rendering the old practice of covering the bloom unneccessary. The seeds are either planted in hills three feet in the square, or in drills three feet distant, the hills in the row fourteen inches apart. Two kernels are placed in each hill, and covered to the depth of one and a half or two inches. After the proper preparation of the soil from the start but little tillage is required, the main efforts being directed to the destuction of weeds. The crop should be harvested before the first frost, to keep the quality of the vines for fodder unimpaired and also to prevent injury to the kernel. In harvesting, the vines are plowed up and removed from the ground with the pitch fork, carefully shaking off all loose soil. They are loosely stacked up to insure free circulation of the air under protection from dew and rain. After the vines have been perfectly cured the nuts are ready to be picked.

Fifty to sixty bushels to the acre by proper fertilizing, good cultivation and a rational rotation of crops, is considered a fair yield. By the neglect of these requirements the average yield in the United States is little over 17 bushels; in Virginia 20 bushels. By a crop of from fifty to sixty bushels to the acre from one to two tons of excellent fodder can be secured, which in its nutritive value compares favorably with the best of forage plants.

Only nuts of good quality should be put on the market. The refuse affords a most excellent food for fattening hogs.

According to the report of the Chief of the Division of Forestry fo 1893, which contains an unusual amount of interesting matter, at least fifteen forestry periodicals are published in Germany, one of which is weekly, six monthly, one quarterly, five annually and two irregularly.

For the purposes of the American forestry student the Universities of Munich and Zurich are recommended.

ITINERARY OF THE MEETING OF THE AMERICAN FORESTRY ASSOCIATION IN SOUTHERN NEW JERSEY FROM MAY 15—19, 1895, UNDER THE AUSPICES OF THE NEW JERSEY FORESTRY ASSOCIATION.

At the meeting of the New Jersey Forestry Association held in Trenton on the 12th of February, 1895, the American Forestry Association was invited to hold its annual peripatetic meeting in Southern New Jersey in May. This invitation has been accepted and the itinerary subject to a few minor modifications has been arranged.

It will be interesting to contrast the level sandy pine lands of South Jersey with the mountains of New Hampshire where the American Forestry Association held a similar meeting last August under the auspices of the New Hampshire Forestry Commission.

South Jersey was once covered with a magnificent forest. Owing to reckless cutting and the destructive effects of fire and drifting sand the woods on the upland have deteriorated to such an extent that in few places in this country are the results of carelessness and prodigality in the treatment of woodland better illustrated. The pine region of Southern New Jersey is better adapted to the growing of forests than to agriculture and in spite of its nearness to large population centres will remain for many years a wooded country. Attention is especially invited to the swamps of white-cedar, which, in the peculiar physical conditions of South Jersey, finds a very suitable environment.

A time has been chosen when many of the peculiar wild flowers for which the region is famous will be in full bloom and when the mosquitos and flies will not be troublesome.

The committee has endeavored to arrange it so that the forest conditions of the region may be seen to good advantage with little discomfort and so that the most famous resorts may be visited where meetings for lectures, discussions and speeches may be held.

We hope that this meeting may lead to the restoration and perpetuation of profitable forests in New Jersey.

The privileges of this expedition are open to al members of the American Forestry Association, New Jersey Forestry Association and Pennsylvania Forestry Association.

The cost of this trip including all expenses from the morning of May 16th to the morning of May 19th will not exceed fifteen dollars [$15]. The very best accomodations the country affords have been procured.

The expedition will end on the morning of May 19th, so that all who desire may spend Sunday in Lakewood, the famous Winter resort in the pines.

All members of the party are requested to be present at the meeting in Camden on the evening of May 15th since further particulars will be announced at that time, also to reduce the amount of baggage to a minimum and to notify the chairman of the committee as soon as convenient of their intention to join the expedition. This is a rare opportunity to see South Jersey at a cheap rate owing to the unusual reductions and favors offered by transportation companies and hotels, to meet people prominent in the forestry movement and to hear interesting discussions and lectures on the subject.

At the meeting in Camden on the evening of May 15th, after short addresses of welcome, Prof. B. E. Fernow, Chief of the Division of Forestry, Washington, D. C., will deliver an illustrated lecture; the exact title of which will be announced later. The following morning, May 16th, the journey will begin.

The itinerary may be divided into three parts: Down the Delaware, Along the Seashore and In the Pines.

May 16—Down the Delaware. Philadelphia to Cape May City.

At that time of the year the trip down the Delaware promises to be very pleasant and interesting. It will be in the height of the shad and sturgeon season. A roomy steamboat has been chartered for the occasion so that the party may stop where and when it desires. Excellent opportunity is afforded for all to become at once ac-

quainted. The low shore of Jersey on the left may be compared in passing with that of her big neighbor on the right, the physical conditions of which are very different although only separated by a narrow sheet of water. Lunch will be served aboard the boat. The party will arrive in Cape May City sometime during the afternoon. A discussion in which several prominent people have promised to take part will be held in the evening.

May 17—Along the Seashore. Cape May to Atlantic City.

If the weather is fit a special train of observation cars will be provided by the Pennsylvania Railroad Company to convey the party northward along the shore. The train will pass in full view of the salt marshes, inland bays and thoroughfares, and will stop at Avalon on Seven Mile Beach, where several members of the American Association for the Advancement of Education are endeavoring to establish a Summer School of Forestry. The following concerning the forests on this beach is quoted from an article by Dr. Chas. Dolley in the *New Jersey Forester* for Jan. 1895: "At Avalon, Cape May County, New Jersey, perhaps as well as anywere in this country, may be seen the effects of drifting sands. There, great dunes rising in picturesque billows to the height of thirty and forty feet above high water mark, extend for miles along the coast, and the process of encroachment and the retarding effect of forest, may be watched in all its phases. The visitor, walking along the crest of one of these sand waves, any breezy summer day, with the myriads of scurrying grains sifting into his shoes and pockets, and at times almost blinding him as they whirl into his face and eyes, is filled with a feeling of wonderment. He sees about him all the appearances of drifting snow, but with the sense that no springtime sun will ever bring back to life and foliage the thousands of trees about him raising their bare and gnarled trunks and branches from the flinty waves which have engulfed them."

After examining the forests on Seven Mile Beach and dining at Avalon the party will proceed northward along the beach within a very short distance of the ocean to Atlantic City. In the evening in Atlantic City an illustrated lecture will be delivered by Dr. Joseph Rothrock, Forestry Commissioner for Pennsylvania.

May 18—In the Pines. Atlantic City to Lakewood.

On the morning of May 18th the party will proceed inland in special cars on the Philadelphia and Atlantic City and New Jersey Southern Railroads. The train will pass through miles of pine barrens and savanna lands, acres of the charred boles of trees killed by fire, with here and there a swamp of white cedar, a cranberry bog or a forest of pine, and cross many streams unrivalled in purity and softness.

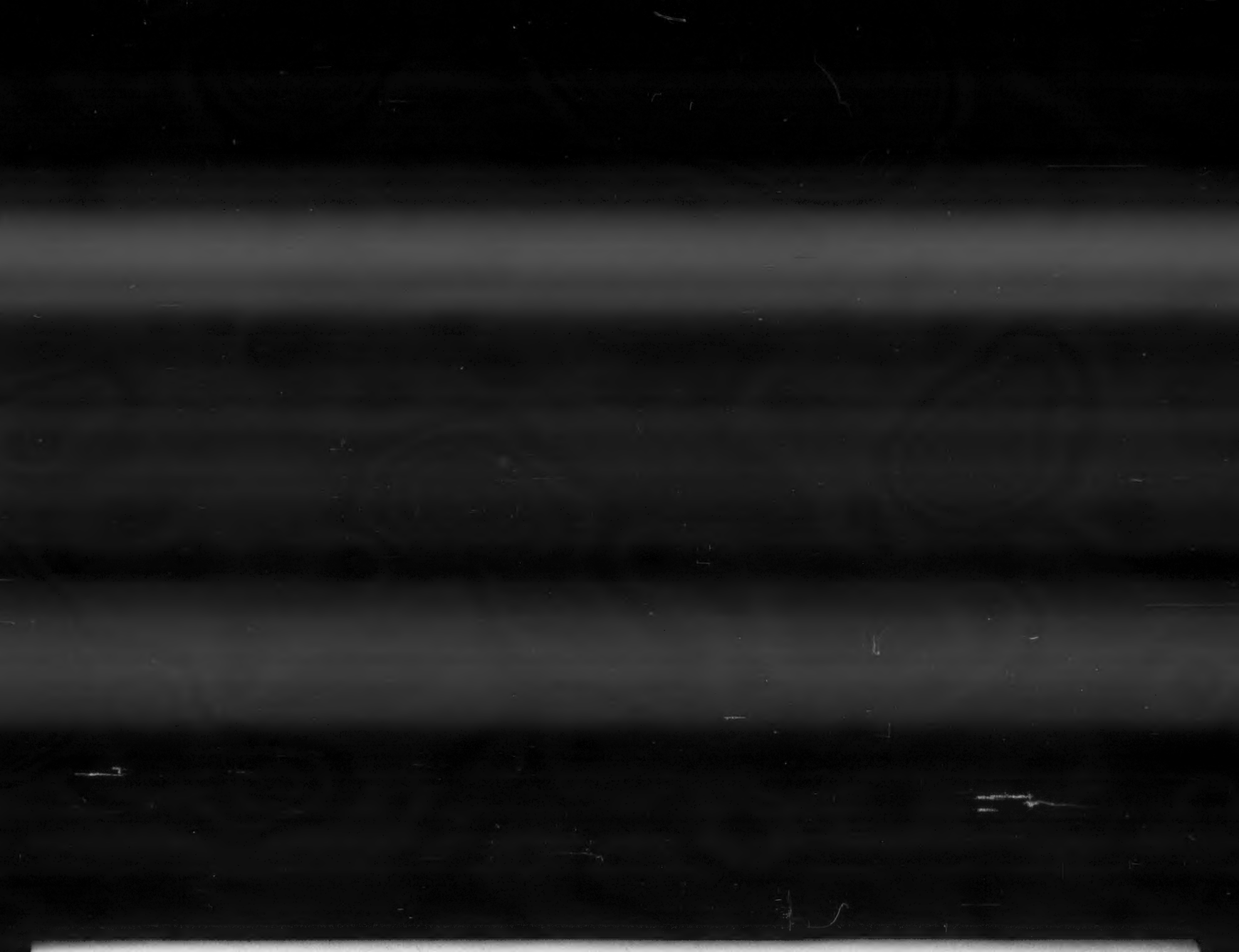
The party will stop at Chatsworth in the heart of the pine region in order to visit the "Plains." Owing to a lack of the proper kind of conveyances the journey to the Plains may be uncomfortable, so any members not desiring to visit this peculiar region may proceed at once to Lakewood where they will find excellent accomodations awaiting them.

The Plains of Jersey cover an area of about fifteen thousand acres. The trees which grow there seldom exceed four or five feet in height. The region is hilly and when the laurel, which is common there, is in bloom, is well worth a visit, in spite of a bad road.

Luncheon will be prepared in the afternoon and the party will proceed to Lakewood where a public meeting will be held in the evening for a discussion in which Edw. A. Bowers Esq., Assistant Commissioner, General Land Office, Washington, D. C., and other prominent individuals will take part.

The following morning May 19th the party will disband. Those who desire may easily visit Long Branch which is not far distant. Others may take the train direct to New York or Philadelphia if they desire.

A table of the exact time of the leaving of trains and boats and a list of the lecturers and speakers and their subjects will be prepared shortly. For further information please write to F. H. Newell, Corresponding Secretary of the American Forestry Association, Washington, D. C.; to D. H. Wright, Secretary of the New Jersey Forestry Association, Riverton, N. J.; or to John Gifford, Chairman of the Committee, May's Landing, N. J.



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LECTURES ON FORESTRY,

By John Gifford.

I. The parts of a tree and their functions — (1) The plant cell and tissues. (2) The roots of trees. (3) The trunks of trees. (4) The leaves of trees. (5) The flowers of trees. (6) The fruits of trees.

II. Principal economic trees of the Eastern United States and West Indies. (1) Trees useful for their woods. (2) Trees yielding waxes, oils, gums, rosins and the like. (3) Trees yieldiug spices, drugs, medicines and the like. (4) Trees yielding fruits.

III. Geographical Distribution of Trees. (1) Agents of Distribution. (2) Barriers.

IV. Forest Influences — (1) In relation to the soil. (2) In relation to climate and water supply. (3) Other influences.

LECTURES ON THE SANITARY INFLUENCES OF FORESTS.

By Dr. Seneca Egbert.

I. The Atmosphere of Forests— (1) Composition and Purity. (2) Temperature and Humidity (3) Influence upon disease germs, epidemics, etc. (4) Relation of forests to special diseases.

II. Forest Streams and Waters.— (1) Composition and qeculiarities. (2) Purity and Potability. (3) Water-supply for large cities. (4) Purifying agencies. (5) Sanitary value of uniformity of flow, relation of rainfall to soil water and water-supply as affected by forests. (6) Sanitary conditions and influences of forest soils. (7) Effects of exercise, out of door life, simplicity of habits, etc.

LECTURES ON GEOLOGY IN RELATION TO FORESTRY AND SURVEYING.

By Dr. T. M. Lightfoot.

I. The Principal ioil forming Rocks. II. The Formation and Varieties of Soils. III. The Forest, a Geological Factor, Surveying and Field work.

CLASS FOR READING GERMAN WRITINGS ON FORESTRY.

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In charge of Prof. Bernhard Maurice,

To acquire a ready knowledge of French and become familiar with French forestry work, besides current literature, parts of "Études sur l'Economie Forestiere" by Jules Clave will be read.

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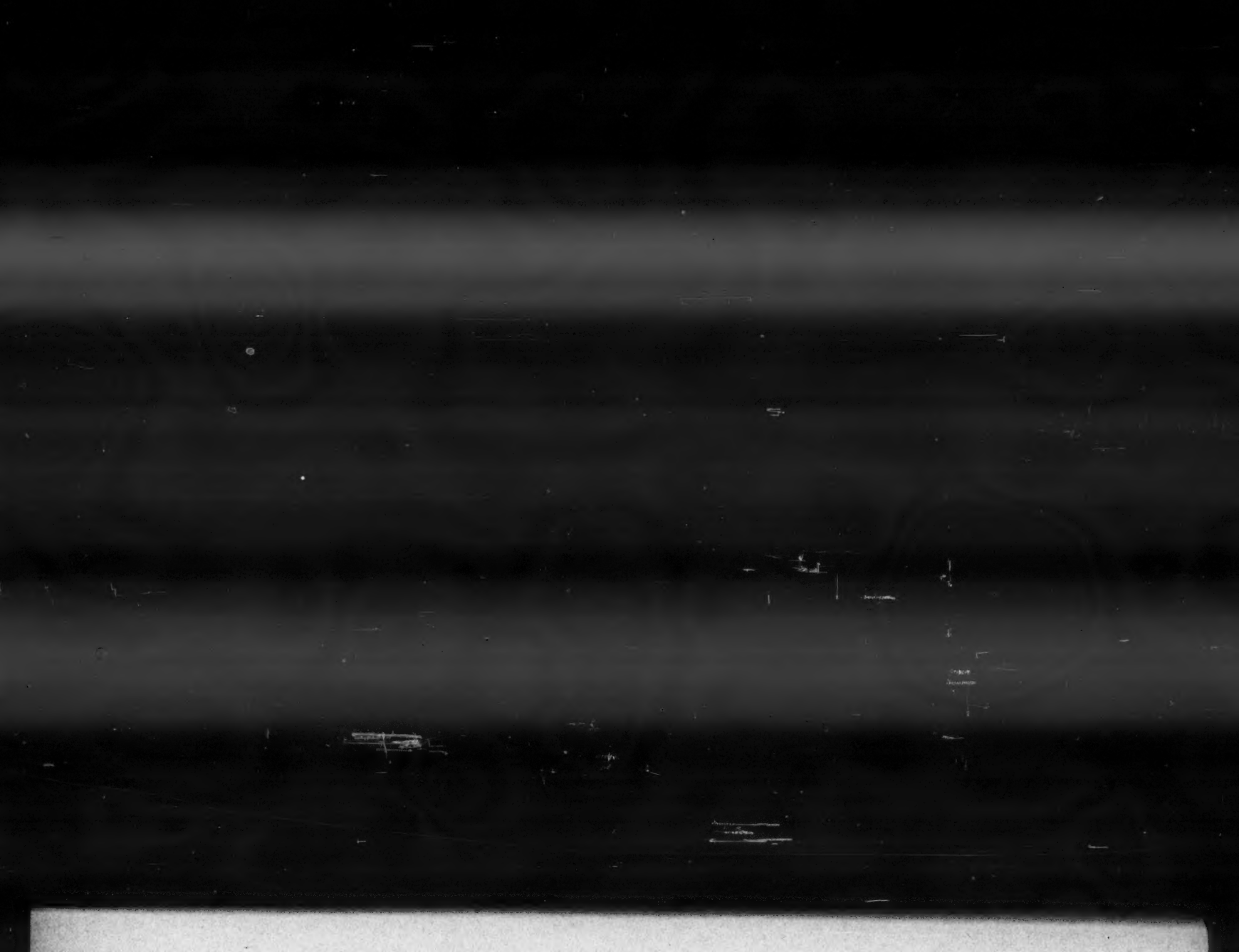
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